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Health—the poor man's riches, the rich man's bliss.

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MILTON, in his *Tractate of Education*, enumerates both vocal and instrumental music among the exercises proper to be introduced into schools. "The time for convenient rest before meat," he remarks, "may both with profit and delight be taken up in recreating and composing the travailed spirits of the scholars, with the solemn and divine harmonies of music, heard or learned: either while the skilful organist plies his grave and fancied descant in lofty fugues, or the whole symphony, with artful and unimaginable touches, adorn and grace the well studied chords of some choice composer—sometimes the lute or soft organ-stop waiting on elegant voices, either to religious, moral, or civil ditties—which, if wise men and prophets be not extremely out, have a great power over dispositions and manners, and smooth and make them gentle from rustic harshness and distempered passions. The like, also, would not be inexpedient after meat, to assist and cherish nature in her first concoction, and send their minds back to study in good tune and satisfaction."

This opinion, which receives the sanction of many names equally celebrated with that of Milton, has been carried into practice in several parts of Europe. In Germany and Switzerland, especially, music constitutes almost invariably a branch of the most improved systems of education; and if any weight is to be placed upon the testimony of the writers of those countries, and that of disinterested travellers, the good effects which have resulted from it have been very considerable. The importance and practicability of making music in this country, also, a part of ordinary education, have been recently urged upon our citizens by Mr. Woodbridge, in an address delivered before the

American Institute of instruction at Boston, and repeated a short time since in this city.*

"Music," remarks the lecturer, "is highly useful as a means of refreshing the weary mind, and is, perhaps, the only employment which leaves the intellect in complete repose. On this account it is peculiarly important to literary men. A distinguished professor of the island of Sicily, on hearing the sad tale of the influence of study on our literary men, asked me, 'What amusements have your literary men in America?' As you will readily imagine, I was only able to answer—*None.* He expressed his astonishment, and added, 'No wonder they are sick, and die of study.' He informed me that he spent a stated portion of the day in recreations, of which instrumental and vocal music were an essential part, and thought he could not live without the relief which they gave his mind.

Vocal music is also very useful, by its direct effect on the constitution. It was the opinion of Dr. Rush that young ladies especially, who by the custom of society are debarred from many kinds of salubrious exercise, should cultivate singing, not only as an accomplishment, but as a means of preserving health. He particularly insists that it should never be neglected in the education of females; and states, that besides its salutary operation in enabling them to soothe the cares of domestic life, and quiet sorrow by the united assistance of the sound and sentiment of a properly chosen song, it has a still more direct and important effect. 'I here introduce a fact,' he remarks, 'which has been suggested to me by my profession; and that is, that the exercise of the organs of the breast by singing, contributes very much to defend them from those diseases to which the climate and other causes expose them.'

We have omitted that part of the quotation from Dr. Rush, in which he speaks of persons "strongly predisposed to consumption," being restored to health by the exercise of the lungs in singing. There can be no doubt, that the frequent prudent use of the lungs in singing, or reading aloud, when commenced early in life, and regularly persisted in, will have a beneficial influence upon the health of these organs. But long continued or violent exertions of the voice, frequently repeated, are injurious to the lungs; they are so, especially, in those individuals in whom a commencing infirmity of the chest has manifested itself. Even singing, or reading aloud, should be practised with great caution, or entirely laid aside by those in whom an occasional spitting of blood, or a short dry cough, and accelerated respiration, indicate already the presence of disease. The safety of individuals thus circumstanced, is not a little enhanced by guarding the lungs from all unnecessary exertion.

"As the mere expression and excitement of cheerfulness, music is a precious gift of God; and it should be used as a means of enjoyment, that it may lead us on to devotion. The ear as well as the eye is made the inlet of pleasure, that we may first enjoy it, and then, by learning its value, be made thankful to Him who bestows it. The late President Dwight observed, 'The great end of God in the creation is to make men happy, and he that

* A Lecture on Vocal Music, as a Branch of Common Education; delivered in the Representatives' Hall, Boston, August 4, 1830, before the American Institute of Instruction. By William C. Woodbridge. Boston. Hilliard, Gray, Little & Wilkins. 1831. pp. 25.

makes a little child happier for half an hour, is so far a fellow-worker with God.' Could music be introduced into common schools, would it not make many little hearts leap with joy? For this purpose, however, the words and the music must be of the proper character."

A specimen of the class of hymns used by the German children and youth is next given, together with suitable notations.

Were we to furnish children with such a means of amusement, the lecturer believes that we should divert them from others of doubtful or injurious character.

"Could we give our young men such a means of excitement, by music appropriate to their age and feelings, we should diminish the temptation of resorting to stimulating liquors, or other questionable means of producing cheerfulness. I have known and visited a village in Switzerland, where a set of drinking disorderly young men were led, by the cultivation of music among them, to an entire reformation, which was regarded with as much surprise as the change in regard to temperance in our own country. I have seen them, when they met at a public house, resort to this method of raising their spirits, instead of drinking, and spend their time in singing songs and hymns, adapted to improve the mind and elevate the heart, instead of the profane or indecent conversation, or noisy clamour which is generally heard on such occasions."

"Plato says, 'Bodily exercise is the sister of pure and simple music; and as exercise imparts health to the body, so music imparts the power of self-government to the soul.' In accordance with this sentiment, I am convinced that it has no small influence on school discipline. I was struck with the superior order and kindly aspect of the German schools in comparison with our own, and ascribed it not a little to the cultivation of music in them. Those who unite in singing with their fellows and their master, will be more disposed to be kind to the one, and obedient to the other.

"In addition to this, the study of music, from its very nature, cultivates the habits of order, and obedience, and union. All must follow a precise rule. All must act together, and move in obedience to a leader; and the habit acquired in one part of our pursuits necessarily affects others.

"But we cannot give music its full influence without combining it with words. It has in this way been made the handmaid of vice, and the companion of depravity, and its influence has been fearful. It should be converted to a better use. 'Let me make the ballads of a nation, and you may make their laws,' said one who was well acquainted with human nature. The maxim is one of obvious soundness. The law is but seen in shadow, and its threatnings heard as distant thunder. Even the pulpit brings forth its instructions only weekly; and the preacher often writes upon a sand beach, from which the returning tides of the business of the week speedily efface almost every vestige of his instructions. But the ballad is fixed in the memory by the association of rhyme and sound: it is constantly brought home to the heart by the sweet influence of melody; and while the law is out of view, and the sermon forgotten, it repeats and reiterates its expressions until it penetrates the hardest heart, and fastens itself in its strongest feelings."

Music is confessedly an innocent and delightful amusement, and to a certain extent exerts a decidedly beneficial influence over the mind and feelings. They, however, whose time is so fully occupied by the serious duties of life as to allow but a short period of the day for relaxation, must be careful in the cultivation

of music, lest what they at first resorted to as an agreeable amusement for their leisure moments, engross in the end too much of their attention, or even becomes their chief pursuit. "It has happened," says Berhenhout,* "that music, which was at first admitted as a handmaid to study, became her mistress; nay, the servant has sometimes been so insolent as to turn her mistress out of doors." Music, whether vocal or instrumental, is, we admit, a far better relaxation from study, business, or the cares of the world, than mere idleness; but it must, also, be recollected, that they who, for the principal part of the day, are confined to studious, sedentary, or anxious occupations, require, during their periods of relaxation, *pure air and active exercise*, both of which are very apt to be neglected, when the time which should be devoted to them is occupied with music.

While we fully coincide in opinion with Mr. Woodbridge on the importance of making vocal music a part of education, we cannot give our assent to the position which he lays down of a musical ear being little else than a cultivated ear. He is right in saying that sounds, like colours, cannot be described by words, but that they must be taught by examples. When, however, we ask whether the impressions produced on the mind by modulated and harmonic sounds are not very different in different individuals—in other words, whether there is not an infinite variety in the delicacy of perception and retentive remembrance of musical sounds among persons displaying, in all other respects, an average equality in mental capacity, as well as acuteness of hearing, the reply, must, we believe, be necessarily in the affirmative. Mr. Woodbridge seems to have given into the error of some other writers on the subject, by making a *musical* ear depend on the sensibility of the auditory sense—forgetting that this latter is merely a sentient expansion, on which sonorous bodies make their first impression, and from which and along the nerve they are transmitted to the brain. It is by means of this latter, or a particular portion of it, that the individual is enabled to have an adequate perception of sounds, to feel their musical combination, and to judge of their adaptation to the purpose for which they were framed or composed. We have, it is believed, no evidence to show that men the most distinguished for their musical genius have been remarkable for the range and delicacy of their hearing—whereas, on the other hand, we have numerous instances of great deficiency or dullness in this sense, accompanied with great musical taste and powers of execution. If music were not of a mental character—requiring a peculiarly constituted mind for a due appreciation of it, when composed or sung by others, and mind of the like peculiarity for ability to compose and sing one's-self, it would be merely sufficient for a person to have good hearing, to distinguish each separate sound, and good memory, to reproduce those sounds, in the order and combination in which they were first presented to his ear. Now we know positively that there is no proportion whatever be-

* Letters to his son at the University.

tween either verbal memory, or memory of places and events, and memory of musical sounds. Since, therefore, the nice perception of these sounds in melodious combination, is not dependent on mere delicacy of hearing, nor the ability to reproduce them dependent on what is usually called a strong and highly practised memory; nor the emotions which they produce commensurate with, or originating from, the possession of what are called kindred tastes, such as of poetry and painting, or lofty imagination; it follows, that musical taste—ability to understand and appreciate musical composition, and musical performance, instrumental or vocal, is something independent of mere hearing or cultivation of the auditory sense, or of mere memory, or of other faculties of the mind; and that it is a peculiar modification of mind; in other words, is dependent on a peculiar and separate faculty. Were it not so—were musical taste and musical genius merely the result of oft repeated impressions on the auditory sense, persons who have become deaf could not enjoy musical composition, nor could they compose music themselves. Whereas, in fact, they have a keen relish in reading music, and can compose themselves, with due reference to melody and harmonious combination, without its being possible for them to sound a single note, or, at least, to hear it when sounded. The innateness as well as the independence of the faculty for music from other faculties, is evinced in its being inherited, and also in its early display even in the infantile state, and in its being met with in persons, as among the Cretins of the Vallais, where there is nearly a destitution of intellect and inability to fix the attention or to exercise the memory on the common elements of learning. Some families are all musical—in others scarcely a member of it can turn a tune.

In respect to the vocality of music, successful singing requires nicely constituted organs; but these would be quite insufficient without the talent or genius to call them into action. We occasionally hear the finest utterance and most melodious voice in speech, without any accompanying musical taste or ability to sing. The individual may give, by echo, as it were, the pitch and key of some of the notes; but without the mental faculty he cannot combine them in musical and harmonious proportions.

But even while thus affirming the separate and peculiar faculty of the mind by which we acquire a knowledge of music, and which in a still higher degree constitutes musical genius, we do not wish to deny the usefulness of Mr. Woodbridge's suggestion. A weak faculty will be strengthened by moderate exercise—a strong one made still more vigorous and varied in its display by the same means. We merely wish to guard against disappointment on the part both of teachers and scholars, and to warn both, that, as all persons have not an aptitude to learn mathematics, so have not all an aptitude to learn music, however determined may be the learner and skilful the teacher.

We ought not to conclude these remarks without apprising our readers of the great success which has attended the labours of Mr. Ives, in his system of elementary vocal instruction, in which he has been for some months past engaged in this city. His meritorious and skilful efforts are attested by a large number of competent judges.

ANIMAL JELLY FROM BONES.

In our last number we presented, from the discourse of Dr. Scoutetten, a short notice of the important advantages which have resulted to the labouring class in France from the establishment of public kitchens, in which a wholesome, palatable and cheap nutriment is produced from the bones of the various animals slaughtered for food. Believing that were similar establishments introduced into our principal cities, much of the suffering incident to the poorer class, especially during the winter season, from defect of wholesome nourishment, would be obviated, we present, from the same source, on the present occasion, one or two of the facts adduced by the lecturer, as illustrative of the good effects which have resulted from these establishments in Paris.

After mentioning that the immense amount of cheap aliment derivable from the jelly of bones has received the full attention of the benevolent in France, Dr. Scoutetten adds:—

"The Philanthropic Society of Paris, the Hospital of St. Louis, and the central house of Refuge immediately adopted the important amelioration which the manufacture of this jelly is calculated to afford, in reference to the food of the poor and labouring classes. Many of the large cities have followed the example set by the capital in this respect. In the Military Hospital of Metz, the gelatin obtained from bones, has been adopted for the nourishment of its inmates; and in every instance the introduction of this kind of aliment has been found to be decidedly advantageous. The most striking and interesting evidence in its favour is that afforded by the director of the mint at Paris, M. Puymaurin, jun. This gentleman having introduced the gelatin procured from bones as a part of the nourishment of the labourers employed in that institution, has had the satisfaction of finding their health increase upon its use, while, at the same time, the pecuniary saving of each individual has been very considerable. Two examples are cited in evidence of the latter fact. The first is that of a labourer with a family of five persons depending on him for support. He was accustomed to expend every four days for their nourishment, without including the cost of bread, 6.90 francs; (138 cents;) after the use of the gelatin he only spent 3.70 francs, (74 cents,) eating every day a pound and a half of meat. For 26 working days his saving, therefore, was 20.18 francs, (416 cents,) and for the year, counting working days alone, 249.60 francs, or 49 dollars 92 cents.

The second example is of a labourer 17 years 6 months old, who spent daily at a tavern for his nourishment 1.35 francs (27 cents) each day; after making use of the gelatin, he found it so substantial a nutriment, that he left off entirely the use of

meat; in consequence his daily food cost him only 0.37 franc, (not quite 7½ cents;) his saving per diem was therefore 0.96 franc, (rather more than 19½ cents,) and per annum, counting 312 working days, upwards of 305 francs, or 61 dollars. This labourer earns during the year 620 francs; (134 dollars;) he saves therefore, by his new diet, nearly the half of his income. In less than three months he placed in the Saving Bank 70 francs, (14 dollars.) How desirable is it that these advantages should be offered to every economical labourer! were this the case, looking forward to the period when old age arrives, and his capacity to labour is weakened or destroyed, he would not have to fear, in conjunction with his bodily infirmities, the miseries arising from abject poverty—we should no longer see old men, whose conduct had been without reproach, but who, from the lowness of their wages and the dearness of provisions, have been unable to lay up any store for the day of need, obliged either to solicit alms, or to wear out the miserable remnant of their days in a hospital."

PHYSICAL EDUCATION.*

Exercise, and Distribution of Time.

We mentioned, in a former number, the external means employed to promote the physical vigour of the pupils of Hofwyl. But, as in all other cases, the voluntary efforts of the individual in the exercise of his powers, are the only means of securing their healthy and vigorous development; and the best climate, the purest air, and the most perfect diet, are insufficient to give health to the inactive. Every means is therefore employed to maintain habits of vigorous bodily exercise.

Careful and ample provision is made for encouraging voluntary exercise. *The requisite instruments for various active games* are constantly furnished, and placed within the reach of the pupils, as regularly as the means of intellectual improvement and amusement.

To connect exercise as much as possible with habits of industry, each pupil, who is capable of such a task, is provided with a *small portion of ground to be cultivated* as a garden, whose fruits afford him a reward, and at the same time an encouragement for foresight, labour, and perseverance. *A workshop*, well furnished with tools and materials *for cabinet work*, under the direction of a master workman, enables those who are disposed to occupy themselves in this manner, to acquire a kind of skill always useful in life, and to manufacture many little articles of convenience or taste.

But in addition to this, *gymnastic exercises* form a part of the regular business of every day. They consist in leaping, climbing, pulling, hanging to a

* American Annals of Education and Instruction, and Journal of Literary Institutions. Vol. I.—Part II.—No. III. Again we would invite the attention of our readers to this valuable work.

beam, pulling a rope, climbing a ladder, running, swimming, &c. They are graduated according to their age. At first they are of such a nature as to develope only the activity of the limbs; and subsequently, such as call forth the strength. They are varied in every mode adapted to develope the muscles; to habituate them to active and rapid movements, to accustom the body to maintain itself in all positions, and to give strength to the organs of respiration. They tend thus to render the constitution more vigorous. They prepare the body for those violent exertions which danger sometimes renders necessary; and for resisting those violent shocks which frequently occur, and which may prove fatal to a feeble frame. But they are especially important in teaching the pupil how to estimate his own strength, to know how far he may safely venture, and what he cannot safely attempt. These exercises take place in the open air when the weather is fine; and at other times in the spacious riding school which I have described as devoted to this object. Fencing and dancing are connected with them, or employed in their place, according to the necessities of the individual, or the wishes of his parents; but are all pursued under constant superintendence, and with frequent examination of their influence upon each individual. Agreeably to the laws of Switzerland, the pupils of the Agricultural School are taught military exercises every month; and during the summer the pupils of the Scientific School have weekly drills of the same kind.

Bathing is also deemed of great importance in the physical treatment of boys. To guard against the enfeebling effects of streams and lakes, heated by the sun* a large bath has been constructed, which is continually kept cool by a *jet d'eau* flowing from a neighbouring spring. In this, the pupils usually bathe twice a day during the summer. A large bath of brick, lined with water cement, ten or twelve feet square, in one of the principal buildings, is heated for warm bathing during the winter, when this is deemed advisable.

An annual pedestrian journey in the mountains of Switzerland, forms an important supplement to these means of improving the bodily strength. The pupils are divided into parties, each under the charge of one of their teachers. The length and nature of the journey, the daily distance to be travelled, and other circumstances, are proportioned to the age and vigour of the party. Each one who is able, carries his own stock of clothing in a knapsack; and they are taught to content themselves with the humble lodgings and scanty, coarse fare, which a numerous party must often meet with in the mountains of Switzerland. Some means of conveyance is generally provided for the occasional relief of those whose strength is not equal to that of their companions, or for the knapsacks of those who are too much fatigued to carry them.

The distribution of time is also made with careful reference to the healthy development of the system.

No lesson continues more than an hour, and an interval of ten minutes is

* We do not vouch for the accuracy of the medical philosophy in this sentence. Our own impression is, that water thus heated by the sun, is a safer kind of bath for common and general use, than spring water.—Eds. *Jour. of Health.*

allowed between the lessons, in which the pupils traverse the buildings, and find that momentary relaxation of mind and body, which enables them to return with new vigour to their task.

The lessons are so arranged, especially with the younger pupils, that the same kind of exertion shall not be continued too long. An hour of music, labour, or play, is interposed between occupations of a more serious kind. Two hours of gymnastic exercises are also so arranged as to furnish mental relaxation, as well as invigoration of body. Care is also taken to occupy the morning, when the mind is fresh, with those studies which require the greatest intellectual effort. The afternoon, when the mind and body are both in some degree wearied, and rendered less active by the effects of the principal meal, is devoted to writing, drawing, music, and the lighter branches of study. In this way, not only is the bodily health promoted, but greater success in study is secured.

The hours and duration of sleep are regulated according to the age and necessity of the pupil, as indicated by the apparent demands of nature, under the direction of a medical adviser. It is deemed irrational to form a single positive scale, which would deprive some of the repose which their bodily state may demand, and would leave others to impair their strength by unnecessary indulgence. To provide against all disturbance of this kind, different sleeping rooms are assigned to the different classes of pupils, according to the amount of rest they need.

The great demands of parents and of society at this day, render it extremely difficult to maintain the proper proportion of bodily and mental occupations, and Fellenberg is sometimes *compelled* to require an undue amount of intellectual exertion, at the period which ought to be chiefly devoted to physical development, and thus, perhaps, hazard a life of feebleness or inactivity. Still it is his intention, in the application of this system, to pay constant attention to *the individual necessities of each pupil.* For this purpose, each one, on his entrance, is subjected to particular examination, in regard to his constitution, his habits, his physical defects and danger, and the peculiar necessities of his age. The general rules in reference to diet, exercise, sleep, and occupation, are modified in accordance with this; and it is intended never to sacrifice, for a moment, the present health or future vigour of the pupil, to the prospect of immediate success in his studies, or to the reputation which the institution might acquire by the brilliant specimens of rapid improvement thus produced. Where the control of the pupil is left, as it always should be, in the hands of the educator, he often permits him to devote but half his time to study. The very eagerness with which some apply themselves, is often only an additional evidence of that nervous excitement which endangers a premature waste of their strength, and which can only be subdued by an unusual proportion of bodily exercise. And so nicely balanced are our physical and moral systems, that one cannot be neglected without injuring the other. It has also been found at Hofwyl, that to indulge the disposition to excessive application, often produces a degree of excitement which gives the ascendancy to dangerous passions, and leads to habits whose tendency is fatal.

THIRST.

DISTINCT from the first and most important purposes for which we take drink, viz. for allaying thirst, and for diluting the solid food taken into the stomach, there is another motive which has great influence over us all; and that is, to gratify the taste, and to tickle the palate. Present pleasure makes us too often oblivious of the future pain and evils which may follow its indulgence; and we are never such ingenious sophists, as when we are finding reasons in favour of a thing, or practice, which, at the moment of temptation, or actual fruition, is agreeable to us. Hence it is, that we meet with so many arguments in the shape of aphorism, verse, rhetoric, and wit, in favour of intoxicating liquors. Not that these drinks are at first so palateable, but, with a little practice, the result of imitation, they stimulate the gustatory sense in a manner which becomes finally to be considered as necessary to one's comfort. It is thus that we are taxed for indulgence in every uncalled for and bad habit. Be it said, also, that the sense of taste—though in close alliance with the digestive sense in the stomach, is not always a faithful sentinel to this latter. However desirable it may be to insure general harmony, we are not to look for identity of sensation between the two, since the tongue and the stomach are supplied by different nerves, each having its own mode of sensibility. Still there is, as already intimated, a close, and one may call it, instinctive connection of function between the two; and hence, among animals generally, the sense of taste, as far as concerns the ingestion of fluid, may be safely relied on as interpreter of what will be agreeable and salutary to the stomach. The same remark might be made of our own species, if we were attentive to preserve the early purity, and, as it were, instinctive discrimination of taste, and not force it to recognize as customary stimulants, various condiments, spices, and intoxicating drinks.

Thirst is a sensation, amounting, at times, to a real irritation, or a want, felt in the throat and stomach. It is brought on by whatever stimulates these parts in such a way as to exalt sensation and diminish the customary discharge of fluids from their surfaces—hence, thirst is excited by condiments and vinous and spirituous drinks. This want is also greater by whatever stimulates the blood vessels and nerves of other parts, with which the stomach sympathises; and on this account it is very urgent, in consequence of exposure to the sun's rays, and in a heated atmosphere, which last stimulates both the skin and the lungs: burns will cause raging thirst: fits of passion, by their exciting powerfully the nervous system, have the same effect.

Thirst, unappeased, excites in its turn the whole animal economy—the senses, which become morbidly acute; the brain, which is rendered irritable and prone to manifestations of impatience and anger; the circulation accelerated and febrile, and the skin hot and parched.

Thirst thus brought on, and augmented by external heating and irritating matters, and by irritation in various parts of the animal economy; and when present, giving rise to increased heat and irritation of the functions gene-

rally, can of course, be mitigated and removed but by one class of agents. These are of a cooling, soothing and sedative nature. Cool air applied to the skin and inhaled into the lungs, or cold water applied to the extremities will sometimes answer. A depressing emotion, as of sudden fear, will, by its prompt sedative action on the nervous system, produce the same result. But that which above all other means is best calculated to soothe the heated and irritated surfaces of the throat and stomach, and thus remove all the troublesome secondary symptoms, is to drink simple water, or the blander watery fluids. The instinctive want of such fluids for drink, is strongly pronounced from the lowest animal up to man. They soothe the irritated sentient surfaces affected in thirst; they furnish matter for the absorbents of these surfaces to carry into the circulation, and thus to preserve the requisite proportion of water in the blood.

While simple aqueous moisture is the chief assuager of thirst, and that without which the want would soon become a raging inflammation and fever, leading to death, yet does temperature also exert a modifying influence. Coldness of the fluid contributes more effectually to allay the nervous irritation in extreme thirst; but, though agreeable at the moment, it is not essentially necessary, and is often hazardous, after the individual has been enfeebled by long and excessive exercise and labour. The safer plan in such a case, is to apply the cold fluid iced or spring water to the hands and face, and use for drink that which is of the temperature of the river or flowing stream. Even in hot weather, water of the temperature which it assumes when exposed to the air, is the best quencher of thirst, though not the most grateful to the taste. Very cold water taken into the stomach, in some cases deadens the senses and produces spasm, and even death. In the most favourable condition of the animal economy it is apt, especially in vigorous habits, to give rise to great *reaction*—increased flow of blood and sensibility of the parts, and of course a fresh call for drink.

The lover of spirituous and fermented liquors, persuades himself that they are excellent quenchers of thirst and mitigators of heat; because he experiences relief from these sensations after he drinks them of an icy coldness. The benefit here was from the adventitious property of the liquor, viz. its coldness; but so soon as this has disappeared, then follows the stimulation and excitement from the alcoholic portion—the thirst is renewed, and if appeased in the same way, soon returns with increased urgency; and finally, the sipper of such liquors is at length brought into the fever of drunkenness, and is greatly surprised to find that his cold spirit and water, or cold wine, or beer, should heat him so excessively. The only element in most of these liquors, by which they at all palliate thirst, distinct from the effect of their artificial coldness, is water.

A very grateful addition to simple water, when used as a drink to quench excessive or feverish thirst, is vegetable acid, and especially the citric, that is furnished so largely in lemon juice; and also acetic acid or vinegar, and pyro-ligneous acid.

Some of the lighter wines and cider are at first refreshing from the acid

they contain; but their effects in this way are more than counter-balanced by their alcoholic element, and their proneness to excite fermentation in the stomach, accompanied by sensation of heat and renewal of thirst. Experience teaches us, that acidity and heartburn are more readily produced by these liquors than by the simple or pure acid diluted with water.

Where the thirst is urgent and continued, that is of a feverish nature, it is not sufficient to swallow large quantities of fluid; the troublesome sensation is soon renewed by the prompt drying of the mouth and throat, and a nearly analogous state of the upper orifice of the stomach, in which thirst is more particularly felt. In such cases, a saccharine or mucilaginous fluid, such as the juice of the sugar cane, or molasses with water, gum arabic with water—are the best drink, since they sheathe, as it were, the parched surfaces, and by being less readily evaporated, preserve them longer moist.

But in addition to these means of relieving thirst by moistening the mouth and throat, allaying the heat of these parts and of the stomach, and furnishing fluid for the absorbents to take up and carry into the circulation, all of which are best done by simple cool water; there are certain organs instrumental in the same end, and also in preventing us from feeling thirsty. These are the salivary glands, from which, by appropriate tubes, pass into the mouth a bland fluid calculated to lubricate continually the mouth and throat, and to be mixed with our solid food during the act of mastication. The very act of chewing will cause saliva to flow into the mouth—no matter how simple, or divested of all taste or chemical properties may be the body chewed; a piece of chip, or of tow, will have the effect—so also will a substance allowed to remain in the mouth and slowly dissolved in it, as we find by putting in a lump of sugar candy or of gum arabic. There are other articles which increase the flow of saliva by stimulating the salivary glands, such are acids, salts, condiments, and certain bitter and narcotic vegetable substances.

It is essentially necessary for comfort and health, were it only in obviating and preventing troublesome thirst, that saliva should always flow into the mouth and preserve the requisite moisture in it and the throat, and indeed in the stomach itself, into which it constantly passes. Usually a deficient supply of saliva is the consequence of excessive action of the salivary glands, as from habitual chewing or smoking of spices, tobacco, opium, and such substances, or from the protracted excitement of high seasoned food, various wines and cordials.—At times, the discharge of saliva is obstructed when the system generally has been over-excited by intense passion, or otherwise in a heated and febrile state.

We learn from these facts, that in the absence of an abundant supply of fluid, a simple substance in the mouth, such as crystalized sugar or gum arabic, will greatly obtund the sensation of thirst, by moderately inviting saliva into the mouth and keeping it moist; while, on the other hand, more acrid and irritating substances, whether solid or liquid, though for a short time, by stimulating the salivary glands, they cause an increased flow of saliva, yet they soon diminish and dry up, as it were, the supply, and in place of obviating, they increase thirst.

We have seen, also, that whatever stimulates the stomach and system generally, will give rise to an increase of thirst. Hence, to moderate and remove it, not only are bland drinks, chiefly simple water, useful, but also cool air for the lungs, cool air and cool water for the skin, the softer emotions for the nervous system. As an evidence of the great influence of this system, at least of the brain and its functions or mind, over the desire for drink, we know that sleep will suspend the cravings of this latter and even entirely remove it.

Hitherto we have not spoken of repletion, or food in the stomach, as a cause of thirst: this cause operates in two ways; first, by quantity, distending the stomach—secondly, by quality, exciting the digestive sense. An example of the first is found in the thirst after a full meal; of the second, after the ingestion of spiced, salted, and smoked articles of food. In the first case much watery fluid, taken into the stomach, will increase the distention, and thus either fail to relieve the thirst, or increase it; whilst, on the other hand, if stimulating drinks are used at this time, they may, by substituting a new sensation for that of distention, give a momentary relief; but they will increase the thirst after the first stage of digestion, and act on the stomach nearly as spices, condiments, and the like, do; they will, in fact, increase the after desire for simple watery fluid, in the way already mentioned; and also by their action on the nervous system and the circulation, will cause a slight febrile condition of the animal economy, and with it thirst.

Next to simple water, and that with the addition of a little mucilage, the fluid, with a slightly saline impregnation, is useful in moderating thirst. Animals, especially herbivorous quadrupeds, usually so particular in taking no other drink but simple water, will often drink with avidity from a saline spring or *lick*. The vessels called absorbents, which drink up fluid to be carried into the circulation, to dilute the blood and aid in the various secretions, are usually very careful to exclude foreign matters; but when they allow the entrance of these, it is saline substances, in minute proportions, in preference to all others.

But as few salts are pleasant to the taste, when they have been dissolved in water, it has usually been the practice to employ those solutions in which there is an excess of acid, as in the cream of tartar; or what at the moment of their formation largely evolves fixed air, which stimulates agreeably the sense of taste, as in what are called soda and seidlitz powders. When we use them, we dissolve in one portion of water the acid, usually the tartaric; and in another the alkali, combined with fixed air or carbonic acid in the form of a carbonate or bi-carbonate of soda. The tartaric acid unites with the soda, forming a salt—the tartrate of soda; whilst the fixed air is disengaged from its combination with the alkali, and froths up in the glass at the moment of the mixture of the two solutions. The inconveniences here are, an occasionally unpleasant distention of the stomach from the fixed air swallowed; and disagreeable sensations produced by the new salts formed at the moment of effervescence. Some will suffer from the excess of acid, others from that

of alkali; so that to gratify the taste, the stomach is often made the recipient for experiments.

This indeed is constantly the case when other drinks, such as distilled or fermented liquors, or large potations of tea or coffee, are employed with a view of alleviating thirst. They flatter the sense of taste; they please, in consequence, for the moment, the individual who takes them, but the stomach pays the forfeit.

The gustatory sense admits of great variety of stimulations, but the digestive sense is not so accommodating; and it is a practical blunder, of no small moment, to make the former the interpreter to the wants of the latter, and to suppose that the vagaries of the one can be responded to in the performance of the healthy functions of the other.

BREAD AND ITS VARIETIES.*

The substance known to us under this familiar title, constitutes that preparation of the esculent grains which affords to man the greatest amount of nourishment in the most convenient and useful form.

The art of making bread is very ancient, since we know, from Scripture, that the Israelites possessed it during their sojourn in Egypt. The Egyptians are, without doubt, the first who understood and practised this important process. From them it passed to the Greeks and Romans, and has now become universal in all countries in which, by agriculture or commerce, the proper material can be obtained.

The substance best suited for the process of making bread, is the flour of wheat, after it has been properly bolted or deprived of its bran. Where other kinds of grain are employed, a certain proportion of wheat flour must be added, in order that the result may possess that lightness and spongy texture which, if not essential to the character of good bread, are among its most desirable and attractive qualities.

The process of making bread divides itself naturally into two parts, namely, the preparation of the dough, and the baking. Dough is produced by the intimate union of flour, water, and leaven. The action of the water, as is well known, is not merely to moisten the flour; the two substances actually combine together in certain proportions; so that it is only the excess of water above this, which is evaporated in the process of baking. In making dough of wheat flour, the quantity of water which thus unites with the flour is estimated at more than one third of its weight. The peculiar quality of the water employed seems to be unimportant, since rain, pump, or well water, answer equally well. The third constituent of dough, leaven, may be obtained from any vegetable substance which has undergone the acetous fermentation: but it is more usual, in baking on a large scale, to employ barm or yeast; a ferment which collects on the surface of fermenting beer. When

* These excellent observations on bread, are extracted, with a few omissions and verbal alterations, from the Boston Medical and Surgical Journal. No. 13. Vol. IV.

first introduced into use, the latter substance was thought by many to be prejudicial to health. This idea has long since been abandoned; but the comparative advantages of yeast and leaven, in making dough, are still matter of dispute. The author of a very able treatise on this subject, M. Parmentier, recommends leaven, on the ground that the precise degree of its action can be calculated, so that there is less danger of the bread being rendered acid on the one hand, or becoming heavy on the other. On this same ground, Dr. Paris advises the use of yeast; and the latter substance is employed in preference in England and this country. It is a curious fact, that yeast which has been dried, and so kept for a considerable time, will, when moistened with water, again serve for the manufacture of bread as well as the fresh article. Dough, properly prepared by the admixture of these three articles, requires to be seasoned with a little salt, and is then subjected to the process of kneading, the effect of which is to incorporate the constituents more perfectly, and to render the mass uniform and homogeneous. That this part of the operation is not unimportant, is well known to those who possess experience on this subject. The chemical union of the flour and water seems to be facilitated by this operation. The water which is added during the process, in place of rendering the dough more moist, is found to impart to it tenacity and consistence. In an economical view, therefore, and as tending to produce the end proposed by the least possible means, it ought by no means to be neglected. After this process, the dough is left to itself, that the rising or fermentation may go on without interruption. The time required for the completion of this process, varies with the temperature to which it is exposed. At that of summer heat, which is as high a temperature as can advantageously be employed, the time required is about five hours. When properly raised, the dough is divided into loaves, and transferred to the oven. The degree of heat which is best suited for baking bread, is stated by Mr. Donovan at 448 deg. Fahr. In the best constructed ovens, this temperature is uniformly maintained by means of air flues from a furnace. Newly baked bread possesses a peculiar odour and taste, which are lost by keeping.

The chemical changes which take place during the process of making bread, are still but imperfectly explained. The most interesting part, namely, the fermentation, which occurs when the leaven is added, is accompanied by the extrication of carbonic acid gas, which, by separating the particles of the dough from each other, produces those eyes or cells which give to the bread its spongy texture; and, while it renders it specifically lighter, imparts to it also an increased fitness to be digested and animalized. As a general principle, the more perfectly bread has *risen*, provided it remains sweet, the lighter and more digestible will it become. Now wheat flour is particularly fitted for the perfection of this process, since the gluten, which enters more largely into its composition than that of any of the farinas, serves, by its tenacious property, to detain the gas, and thus to assist in the formation of the cavities alluded to. Deprived of its gluten, though it would continue to be highly nutritious, and would serve the purpose of many culinary products, its property of making good bread would be wholly destroyed. This is amply

confirmed by the numerous and varied experiments which have been made in the manufacture of this important article. Of the various substances which have been employed in the fabrication of bread, those only answer by themselves, into whose composition this element enters; and of these the lightness and excellence of the bread procured from each, is in proportion to the amount in which this constituent exists. This and other circumstances of difference in the several kinds of bread, may render it interesting to give a description of some of the principal varieties, preceded by a synoptic view of the composition of the substances which form their bases, by which it may be judged whether the correspondence adverted to, actually takes place.

Proportions of Gluten and Starch in several Farinas, expressed in hundredth parts.

	Starch.	Gluten.	Other constituents.
Wheat,	75	12	13
Maize,	—	0	—
Rye,	60	8	32
Barley,	32	3	65
Oats,	59	6	35

In our next, we propose speaking of the varieties of bread.

A PREVENTIVE OF FEVER.

THE best commentary we can offer on the murderous practice, still too general in sickly districts, of the inhabitants using daily their bitters: viz. spirituous tinctures and infusions of vegetable bitter and astringent substances, with the hope of warding off fever, is for us to lay before our readers the following from a highly respectable source.—The author is speaking of the *malaria* fevers, in the country around Rome —diseases similar to our bilious remittent and intermittent fevers.

Pucinotti attributes the severity of the Roman fevers in many cases to the use of the bark, spirits, and other stimulants, which are by some used as preventives; and he relates the case of an old man, who had come from Romagna every second year, to labour during the harvest, in the Campagna of Rome, who never had the fever; and his beverage in the morning and through the day, was *cold water with a little lemon juice.* This practice his father had adopted before him, with the same success; but his two sons, who would use *spirit* (brandy,) and even mixed with it at one time *gunpowder* and at another time *cayenne pepper*, both fell victims to the fever.

The CATECHISM OF HEALTH is for sale at this Office, and by the principal Booksellers throughout the Union.

The work ON BATHS and MINERAL WATERS, by John Bell, M. D., is nearly ready for publication.

All communications relative to the Journal of Health, and Journal of Law, are in future to be addressed to the LITERARY ROOMS, 121 Chesnut street, Henry H. Porter, Proprietor.

The first number of the "Monthly American Journal of Geology and Natural Sciences," conducted by G. W. Featherstonhaugh, Esq. will be issued the first of July, from the Literary Rooms, No. 121 Chesnut street.